

Classic workshop

HandsON



Assembling the E-type's IRS

Our Series 1 4.2 E-type continues to go back together, and now we're on the good stuff where progress really feels as though it's being made – here, we reassemble the Independent Rear Suspension

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We've covered Jaguar's excellent Independent Rear Suspension (IRS) before and so do not intend to go into great depths here, but as it's vital that we demonstrate what we are doing with the E-type we don't want to miss anything, so will show how everything goes together.

Alan Slawson has carved a big name for himself in the rear axle world and, to date, has handled every one of the JWM project cars – each has been without fault or failure. So it was natural to turn the E-type over to him. Alan's task was to take everything we threw at him in big boxes and make some sense of it.

We've chosen to retain the original Dunlop rear calipers, after all they have performed very well over the last 30,000 miles. First time around the pistons were stainless steel lined and so we had no worries about refreshing them with new hydraulic seals (repair kits were sourced from SNG Barratt). However, nothing could have prepared us for the sight when we stripped the caliper pistons – they were full of rust. Okay the integrity of the cylinders was not impaired as once they had been cleaned the stainless steel liner was perfect again (see Our Jaguars, October 2010), but that rust must

Alan Slawson with the rebuilt (and up-ended!) IRS



have been picked up somewhere in the system, despite regular changes of brake fluid. It was perhaps due to the period of inactivity when our attention was switched to the finalising of the Mk 1 project, where oil leaks precluded the E-type's use.

Our Gaz dampers have been on the shelf for a little while now but having driven cars with them fitted before and been impressed, we're taking the option. The rears come complete with springs on an adjustable platform to allow infinite tuning.

So many of the other parts needed for the IRS rebuild are still available from Jaguar Classic Parts, an encouraging prospect to the integrity

of the finished job. All of the bearings, radius arm mounts and frame mounts are available over the counter. Should your radius arms be missing or damaged then complete arms can be supplied by Jaguar but they will be the later XJ type: with fully enclosed box section rather than the original top-hat section. Ours were so good we simply had them powder coated by Maldon Powder Coating (Our Jaguars, December 2010) and fitted the new Metalastik bushes. Impressed by their performance on our 3.4 saloon, we're fitting EBC Green Stuff brake pads too.

Acknowledgements:

Work carried out by: ajsengineering.com
Brakes: EBCbrakeshop.co.uk/Pads
Original Jaguar parts: jaguarclassicparts.com
Rear caliper repair kit: sngbarratt.co.uk
Gaz shock absorbers (available from most specialists): gaz-shocks.co.uk
Locking wire pliers: frost.co.uk

Reference material from Kelsey:
Jaguar World Jaguar 6 Cylinder Engine Overhaul (including IRS and SU Carburettors)
JWM back issues: September/October 2007

DE-BURRING AND CLEANING



1 It is vital that all traces of protective or decorative paint be removed from rebuilt parts. It will chafe away leaving clearance, which will have a detrimental effect on final set-up



2 Burrs are another problem that if left, will make perfect face-to-face contact impossible. Edges should be lightly filed until true



3 These discs are as new so we are reusing them but it is vital that the light dusting of rust is taken off otherwise the camber setting will be affected. A Scotch cleaner is being used

PREPARING THE DIFFERENTIAL



4 Caliper mounting brackets are fitted to the output shaft body retaining bolts. Here Alan is using freshly zinc-plated brackets.



If in doubt over where they are fitted, refer back to the photographs (we did tell you!) you took earlier or refer to the workshop manual/ parts book. There is no torque setting in the workshop manual so fully tighten using a regular ratchet wrench – nothing longer. Locking wire secures the three bolts together



5 Alan uses new inner wishbone fulcrum arm mounting bolts where possible before tightening the arm to the diff body. Note, this will be finally tightened once assembled into the IRS frame as shims will be needed to space the bracket onto the fulcrum shaft



6 Just to check the disc for true, it is fitted to the output shaft, fully tightened and a dial gauge placed on the face – when spun, any distortion will show up on the gauge



7 When fitting the caliper, it has to be centralised over the disc. First fit the caliper and then measure between the disc and caliper body on both sides of the disc



8 There will be an imbalance in the gap so the difference has to be made up using shims



9 Once the correct shims have been determined the calipers can be fully bolted up. Check again before fitting the locking wire



10 Our brake pad support plates were in bad shape but Alan had some new in stock

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11 The handbrake assembly can now be fitted. Copper grease is applied to the two pin bolts, which secure each handbrake arm to the caliper. The pins pass through the spring fork, which in turn fits into the handbrake arms. With the bolts fully tightened, the arms should be free but will return against the spring fork. Turn back the lock-tab



12 The handbrake pads on later cars are self-adjusting and if things are well lubricated and set up, it does work. Wind the large adjuster screw in until it 'kisses' the disc and then wind back a couple of turns. Jaguar recommends a gap of 0.004in. Fit a new split-pin through the hole in the arm so that it passes through and retains the screw head

FITTING THE DIFF FRAME



13 Lower the IRS frame over the differential and secure with the four special bolts and fully tighten to a torque of 75 lb ft. We have seen frames crack along the top between these bolts so check thoroughly. Lock-wire the bolts together



14 With the diff bolted in place the frame is turned on its



back and the driveshaft fitted, using the same camber shims as were removed between the disc and shaft. Bolt up using the latest Metalock nuts, not Nylocks. Insert shows the three types: early right, replacement left, current centre



15 Fitting the lower wishbone can be fiddly, as three or four hands are needed! Alan has fabricated a distance piece of metal (also used for setting the geometry) to take the place of a damper. This allows the wishbone to float making fitting that much easier



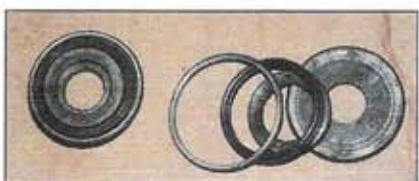
16 Now comes the part where the lower wishbone is fitted. The fulcrum shaft travels through the frame into the wishbone fork and the wishbone carrier (loosely fitted). Between the forks is a covered distance piece. Either side of the fork is the seal/washer assembly



17 There will be a gap between the wishbone carrier and the diff casing. To compensate shims have to be fitted. Measure the gap and fit shims of suitable values (available in 0.005in and 0.007in). It is vital that no paint or debris is trapped otherwise the shims will shake loose



18 Once the shims are fitted, lock-wire the bolts together, then fit the distance tube



19 Assemble the seal onto the wishbone forks. It should be metal ring against the fork, rubber seal with insert washer and large outer washer



20 The wishbone shaft is tapped into position (using a soft blow hammer) and tightened with new Nylock nuts. The correct torque is 55lb ft but we prefer to do this when there is a load on the car

SHOCK ABSORBERS AND RADIUS ARM



21 On the E-type the radius arm has to be fitted before the hubs. This changed with the XJ series. Only use genuine Metalastik bushes (stocked by Jaguar Classic Parts). The correct method is to place the slot in the direction of thrust (as shown). We prefer to rotate by 90 degrees to give more resistance



22 Whilst it is possible to press in both the small and large (illustrated) radius arm bushes in a heavy vice, a hydraulic press is preferred. It is important that the mount goes in square with the slots in the correct position (either straight ahead or to the side, see 21)

23 The radius arm is secured to the lower wishbone by a 'thin head' special bolt. Wear is expected as seen here due to the rotation of the arm



24 Ensure that the bolt hole in the lower wishbone is clear as debris will accentuate wear in the damper pin



25 Most replacement dampers rely on using the existing bushes. Gaz, however, supplies the full kit rendering the original redundant. Don't throw it, though, it may be useful at some point!



26 Fit the dampers into the cage ensuring they are the correct way up. With the frame on its back it is all too easy to fit the dampers the correct way up only to find they are upside down when the frame is righted. Set the adjuster about a third of its full range and finally set once road tests are finished



27 With the damper retaining shaft coated in copper grease and the setting piece removed, drive the shaft through the lower damper eye, through the lower wishbone picking up the other damper before fully tightening



28 The radius arm securing bolt is pushed into the lower wishbone to pass through the radius arm small bush with the bolt head flush in the wishbone, and then fully tightened using a new Nylock nut

FITTING HUB AND FINISHING



29 We've already covered rebuilding of the hubs (see *JWM* Sept/Oct 2007) so no further explanation is needed here. In this image the hub has been fed over the driveshaft while a dummy shaft keeps all of the bearings, seals and shims on the fulcrum shaft in place. The hub must be centralised within the wishbone. With the hub body held firmly on one side, a measurement is taken at the other. This is divided by two to get an equal shim value each side. Shims are available in 0.004in sizes. Once fitted the fulcrum shaft can be driven through, new Nylock nuts fitted and tightened to a torque of 55lb ft



30 When fitting the splined hub over the driveshaft, ensure that the split-pin holes are in line, fit the castellated nut and tighten to a torque of 140lb ft, remembering to fit a new split-pin



31 Fit a new grease nipple to the hub with the right angle access pointing inwards (inset) then refit the lower pan - ensure that any distortions caused by incorrect jacking have been taken out



32 Alan applied some copper grease to the back of the brake pad (NOT the friction surface) before fitting into the caliper. Note: Never use Nylock nuts to hold the pad in place as the nylon will melt with the heat from braking



33 Some abandon the U/J covers, but we fit them. They are pop-riveted together and then the end held with a Jubilee clip. Make sure that the access hole lines up with the grease nipple



34 Lastly, don't forget to grease the inner fulcrum shaft

NEXT MONTH:
We begin on the engine